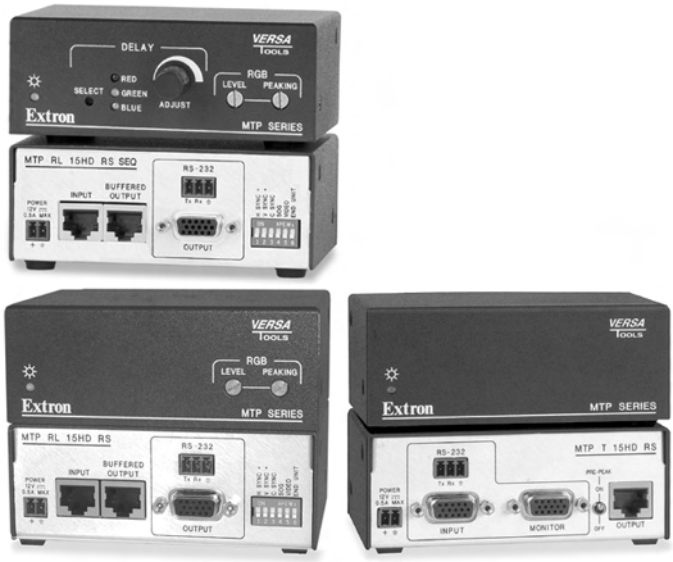
Extron® Electronics

INTERFACING, SWITCHING AND CONTROL

User's Manual



VersaTools® MTP 15HD RS Series

High Resolution Video and Serial Link Mini Twisted Pair Transmitters and Receivers

68-925-02 **Rev. D**
07 09

Precautions

Safety Instructions • English

This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

Read Instructions • Read and understand all safety and operating instructions before using the equipment.

Retain Instructions • The safety instructions should be kept for future reference.

Follow Warnings • Follow all warnings and instructions marked on the equipment or in the user information.

Avoid Attachments • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Consignes de Sécurité • Français

Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).

Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

Lire les instructions• Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

Conserver les instructions• Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

Respecter les avertissements • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

Eviter les pièces de fixation • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Sicherheitsanleitungen • Deutsch

Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.

Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

Lesen der Anleitungen • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits-und Bedienungsanleitungen genau durchlesen und verstehen.

Aufbewahren der Anleitungen • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

Befolgen der Warnhinweise • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

Keine Zusatzgeräte • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Instrucciones de seguridad • Español

Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.

Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaucion

Leer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

Conservar las instrucciones • Conservar las instrucciones de seguridad para futura consulta.

Obedecer las advertencias • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

Evitar el uso de accesorios • No usar herramientas o accesorios que no sean especificamente recomendados por el fabricante, ya que podrian implicar riesgos.

Warning

Power sources • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

Power disconnection • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

Power cord protection • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

Servicing • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

Slots and openings • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

Lithium battery • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Avertissement

Alimentations• Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.

Déconnexion de l'alimentation• Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

Protection du cordon d'alimentation • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

Réparation-maintenance • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

Fentes et orifices • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

Lithium Batterie • Il a danger d'explosion s'll y a remplacment incorrect de la batterie. Remplacer uniquement avec une batterie du meme type ou d'un ype equivalent recommande par le constructeur. Mettre au reut les batteries usagees conformement aux instructions du fabricant.

Vorsicht

Stromquellen • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdanschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

Stromunterbrechung • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stomversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

Schutz des Netzkabels • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

Wartung • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.

Schlitze und Öffnungen • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

Litium-Batterie • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearia ni eliminaria.

Desconexión de alimentación eléctrica • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

Protección del cables de alimentación • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

Reparaciones/mantenimiento • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalientamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

安全须知 • 中文

这个符号提示用户该设备用户手册中有重要的操作和维护说明。

这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

警告

电源 • 该设备只能使用产品上标明的电源。 设备必须使用有地线的供电系统供电。 第三条线（地线）是安全设施，不能不用或跳过。

拔掉电源 • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

电源线保护 • 妥善布线， 避免被踩踏，或重物挤压。

维护 • 所有维修必须由认证的维修人员进行。 设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

通风孔 • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。 不要用任何东西挡住通风孔。

锂电池 • 不正确的更换电池会有爆炸的危险。 必须使用与厂家推荐的相同或相近型号的电池。 按照生产厂的建议处理废弃电池。

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The Class A limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

NOTE *This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance with FCC emissions limits.*

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This manual documents two families of Extron MTP transmitters and receivers:

- MTP, compatible with Extron's Enhanced Skew-Free™ A/V UTP cable and Category (CAT) 5, 5e, and 6 shielded twisted pair (STP), unshielded twisted pair (UTP), or foil shielded twisted pair (FTP) cable.
- MTP C7 [CAT 7, C7], compatible with CAT 7 cable **only**.

In this manual, any reference to these products refers to either family, unless explicitly stated.

NOTE *For clarity and where applicable, in this manual, the CAT 5/5e/6 versions are referred to as non-C7 MTPs.*

About this Manual

This manual details the installation and operation of the:

- MTP T 15HD RS twisted pair (TP) transmitter
- MTP RL 15HD RS receiver with loop-through
- MTP RL 15HD RS SEQ receiver with loop-through and skew equalization

In this manual:

- The term "transmitter" refers specifically to the MTP T 15HD RS transmitter.
- The term "receiver" refers to either of the receiver models, the MTP RL 15HD RS or MTP RL 15HD RS SEQ.
- The term "SEQ receiver" refers specifically to the MTP RL 15HD RS SEQ receiver with skew equalization capabilities.

About the MTP Transmitters and Receivers

The Extron MTP T 15HD RS transmitter and MTP RL 15HD RS and MTP RL 15HD RS SEQ receivers are a system for long-distance distribution of VGA or other high resolution video and RS-232 serial communications.

The non C7 MTPs transmit and receive over Extron's Enhanced Skew-Free A/V UTP cable or over CAT 5, 5e, or 6 shielded twisted pair (STP), unshielded twisted pair (UTP), or foil shielded twisted pair (FTP) cable.

The C7 MTPs transmit and receive over CAT 7 TP cable *only*.

The MTPs are a part of the Extron VersaTools® line of basic distribution amplifiers, switchers, transmitters, receivers, and associated video accessories.

High resolution video is sent to the MTP transmitter on a 15-pin HD connector. The transmitter passes RS-232 serial data or control signals on a 3.5 mm 3-pin captive screw connector. The transmitter converts the video and RS-232 signals to proprietary signals and outputs them to the compatible MTP receiver on an RJ-45 connector. The transmitter also makes the input video available for local use on a 15-pin HD connector.

The transmitted proprietary signal is sent to the receiver on an RJ-45 connector and converts the signal back into its high resolution video and serial data components. The receiver outputs the video on a 15-pin HD connector. The serial communications are passed on a 3.5 mm 3-pin captive screw connector.

The RS-232 portion of the TP link:

- Can be bidirectional in a one-receiver system; that is, the receiver can receive commands from the transmitter and pass RS-232 responses to the transmitter.

NOTE *By default, the RS-232 portion of the TP link is unidirectional only from the transmitter to the receiver. If there is only one receiver in the system, you can shift a jumper in that receiver (see "Receiver Jumpering" on page 6) to allow bidirectional RS-232 communications and change a DIP switch setting (see "End Unit switch" on page 18 to properly terminate the signal).*

- Supports software flow control (XON, XOFF).

NOTE *Hardware flow control is not supported.*

- Supports full duplex and half duplex operation.
- Supports any baud rate (up to 38,400), data bits, parity, stop bits, and data format without configuration.

NOTE *Higher rates are possible, but performance will vary as a function of baud rate and TP cable length.*

The receiver also buffers the proprietary input signal and sends it to another compatible MTP receiver or to a daisy chain of receivers.

NOTE *The transmitter provides pre-peaking, which boosts the signal before it is transmitted. The receiver's buffered output does not provide any pre-peaking control. The total recommended distance (page 5) for an entire daisy chain is the same as for a single transmitter and receiver. The transmitter's Pre-Peak switch has the same effect on the recommended transmission distance for a daisy chain as for a single transmitter and receiver.*

NOTE *Up to eight receivers can be connected in series using Buffered Output connectors, provided that the total distance from the transmitter's TP output to the last receiver in the chain does not exceed the recommended distance for the resolution being used.*

The SEQ receiver also corrects the skew delay (misconvergence) commonly encountered when using CAT 5, 5e, 6, or 7 TP cables for RGB video, component video, and S-video transmission.

NOTE *An SEQ receiver should not be necessary when Extron Enhanced Skew-Free A/V UTP cable and non-C7 transmitter and receiver(s) are used.*

The MTPs ship with external desktop 12 V power supplies that accept 100 to 240 VAC, 50-60 Hz input.

Twisted pair (TP) cable advantages

Twisted pair cable is much smaller, lighter, more flexible, and less expensive than coaxial cable. These TP products make cable runs simpler and less cumbersome. Termination of the cable with RJ-45 connectors is simple, quick, and economical.

Transmission distance

The maximum distance is determined by the frequency and resolution of the signal that is input to the transmitter. The table below specifies the recommended maximum transmission distances and transmitter Pre-Peak switch positions (see item ⑤ on page 14) using Extron Enhanced Skew-Free A/V UTP cable or UTP CAT 5, 5e, 6, or 7 cable, terminated with RJ-45 connectors.

NOTE *It is possible to exceed the recommended distance; however, image quality may be reduced.*

NOTE *The non-C7 transmitter and receiver are designed for and perform best with Extron Enhanced Skew-Free A/V cable terminated in accordance with the TIA/EIA T 568 A wiring standard. CAT 5, 5e, and 6 cables are acceptable for the non C7 models, but less preferable. We also recommend the use of preterminated and tested cables. Cables terminated on site should be tested before use to ensure that they comply with Category 5 specifications.*

NOTE *Resolutions marked with an asterisk (*) in the table that follows have the same range specifications at 75 Hz.*

NOTE *Extron recommends using at least 25' of TP cable between the transmitter and the first receiver.*

Recommended Pre-Peak switch positions and transmission distances at 60 Hz

Video Format	Pre-Peak off	Pre-Peak on	Max. distance (high quality)	Max. distance (variable quality)
Composite, S-video, Component			800' (245 m)	1000' (300 m)
640 x 480	<300' (90m)	>350' (105 m)	700' (215 m)	750' (240 m)
800 x 600	<300' (90m)	>350' (105 m)	550' (165 m)	650' (200 m)
1024 x 768*	<300' (90 m)	>350' (105 m)	500' (150 m)	600' (185 m)
1280 x 960*	<300' (90 m)	>350' (105 m)	400' (120 m)	500' (150 m)
1280 x 1024*	<250' (75 m)	>300' (90m)	350' (105 m)	450' (135 m)
1360 x 765	<250' (75 m)	>300' (90 m)	400' (120 m)	500' (150 m)
1365 x 768	<250' (75 m)	>300' (90 m)	400' (120 m)	450' (135 m)
1366 x 768	<250' (75 m)	>300' (90m)	400' (120 m)	450' (135 m)
1400 x 1050	<250' (75 m)	>300' (90m)	350' (105 m)	400' (120 m)
1440 x 900	<250' (75 m)	>300' (90m)	350' (105 m)	400' (120 m)
1600 x 1200*	<250' (75 m)	>300' (90m)	300' (90 m)	450' (135 m)
1920 x 1200	<250' (75 m)	>300' (90m)	300' (90 m)	400' (120 m)
2048 x 1080	<250' (75 m)	>300' (90m)	300' (90 m)	400' (120 m)
HDTV 720p	<250' (75 m)	>300' (90m)	400' (120 m)	500' (150 m)
HDTV 1080i	<250' (75 m)	>300' (90m)	300' (90 m)	400' (120 m)
HDTV 1080p	<250' (75 m)	>300' (90m)	300' (90 m)	400' (120 m)

NOTE *The recommendations shown in the table above apply for a single transmitter and receiver and for a transmission daisy chain. For example, the maximum suggested range for 1024 x 768 video is 300' (90 m) with Pre-Peak off and 500' (150 m) with Pre-Peak on whether the system consists of one transmitter and one receiver or a transmitter and three daisy-chained receivers.*

NOTE *For daisy-chained units, the first receiver in the chain must be at least 100' (30 m) from the transmitter when the Pre-Peak switch is on.*

NOTE *For daisy-chained units, any receiver in the chain closer than 350' (105 m) may experience some form of over-peaking when the Pre-Peak switch is on. An overpeaked image may appear bloomed.*

Receiver Jumpering

By default, the receiver is unidirectional, configured to send serial data from the transmitter to the receiver, only. If the system has only one receiver, this jumper can be repositioned to enable bidirectional communication as follows:

1. If applicable, disconnect all cables, remove the receiver from its installation location, and remove any mounting brackets installed.
2. Remove the two screws from either side of the receiver (four screws total) and lift the top cover off of the receiver (figure 1).

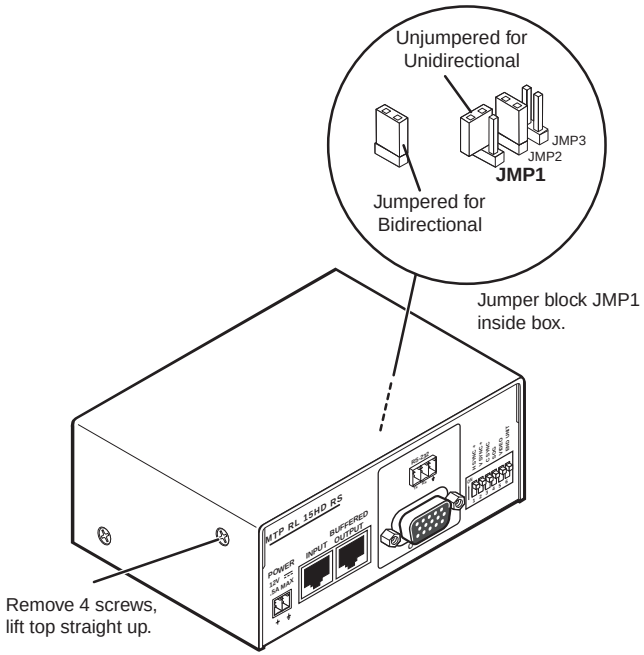


Figure 1 — Opening the receiver and setting directional jumpers

3. Locate jumper JMP1 on the serial data (top) board and shift the jumper to bridge the jumper block (figure 1).
4. Place the top cover back into place.
5. Reinstall the four screws removed in step **2**. If any mounting brackets were removed in step **1**, put them back into position as you reinstall the screws.
6. If applicable, reinstall the receiver and reconnect all cables.

Installation

CAUTION *Installation and service must be performed by authorized personnel only.*

The 1U high, quarter rack width, MTP transmitter and receiver can be mounted on a rack shelf, to a rack without a shelf, under a desk or tabletop, or on a projector bracket.

Rack mounting

UL guidelines

The following Underwriters Laboratories (UL) guidelines pertain to the installation of the unit into a rack.

1. **Elevated operating ambient temperature** — If the equipment is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consider installing the equipment in an environment compatible with the maximum 122° F (50° C) ambient temperature (Tma) specified by Extron.
2. **Reduced air flow** — Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading** — Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading** — Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

5. **Reliable earthing (grounding)** — Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (such as the use of power strips).

Installation instructions

For optional rack mounting, mount the MTP on any of the following rack shelves:

- RSF 123 VersaTools rack shelf kit (part #**60-190-20**) (figure 2 on page 9)
- RSB 123 VersaTools basic 1U rack shelf (part #**60-604-21**)
- RSU 126 6" deep 1U rack shelf kit (part #**60-190-10**)
- RSB 126 6" deep basic 1U rack shelf (part #**60-604-11**)
- RSU 129 standard 9.5" universal 1U rack shelf kit (part #**60-190-01**) (figure 3 on page 9)
- RSB 129 basic 9.5" universal 1U rack shelf (part #**60-604-02**)

On the standard rack shelf, the MTP mounts in one of four locations to the rear of the rack or in one of four locations to the front of the rack.

1. Remove the feet from the bottom of the MTP, if they are installed.
2. Mount the MTP using two 4-40 x 3/16" screws in opposite (diagonal) corners to secure the MTP to the shelf.
3. Install false faceplate(s) or other unit(s) to the rack shelf.
4. Insert the shelf into the rack, aligning the holes in the shelf with those of the rack.
5. Secure the shelf to the rack using the supplied machine screws (figure 3).

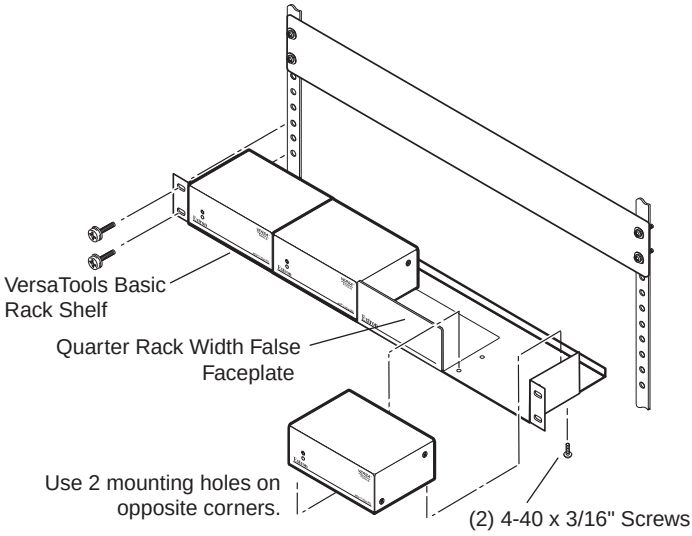


Figure 2 — Mounting the MTP on a VersaTools shelf

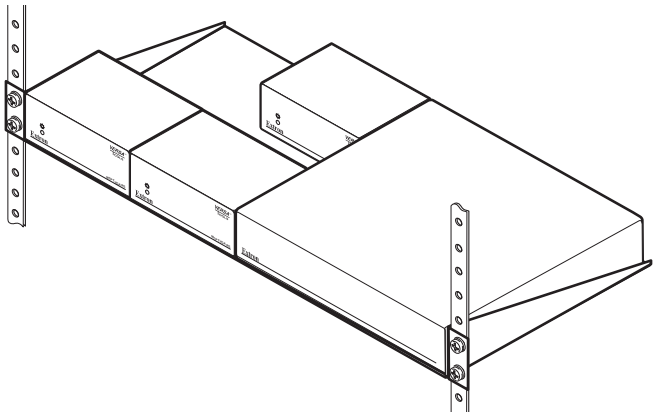


Figure 3 — Mounting the MTP on a standard shelf

Back of the rack mounting

The MTP can be mounted to the rear of a rack using the Extron MBB 100 VersaTools back of the rack mounting kit (part #**70-367-01**) (figure 4). The kit allows the product to be vertically mounted to the front or rear rack supports and facing either towards the front or the rear of the rack.

1. If installed, remove feet from the bottom of the MTP.
2. Remove two screws from one side of the unit. Retain the screws for possible later reassembly without the bracket.
3. Attach one bracket to the side of the unit (figure 4) using the longer screws included in the kit.
4. Repeat steps **2** and **3** on the other side of the unit.
5. Mount the unit to the rack using the two included rack screws (figure 5). The MTP can be vertically mounted facing in either direction.

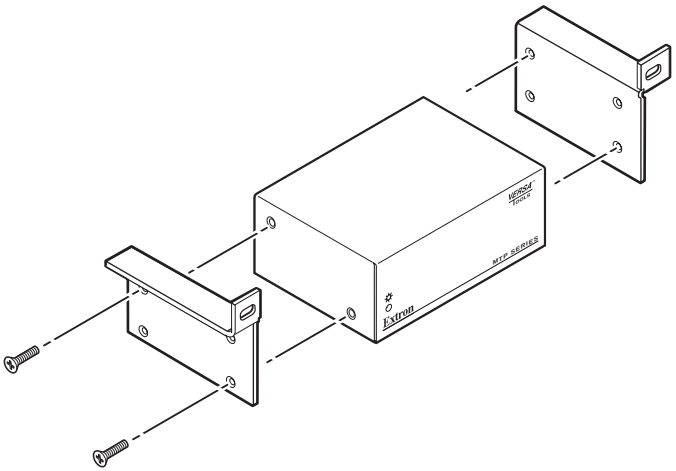


Figure 4 — Attaching the back of the rack kit

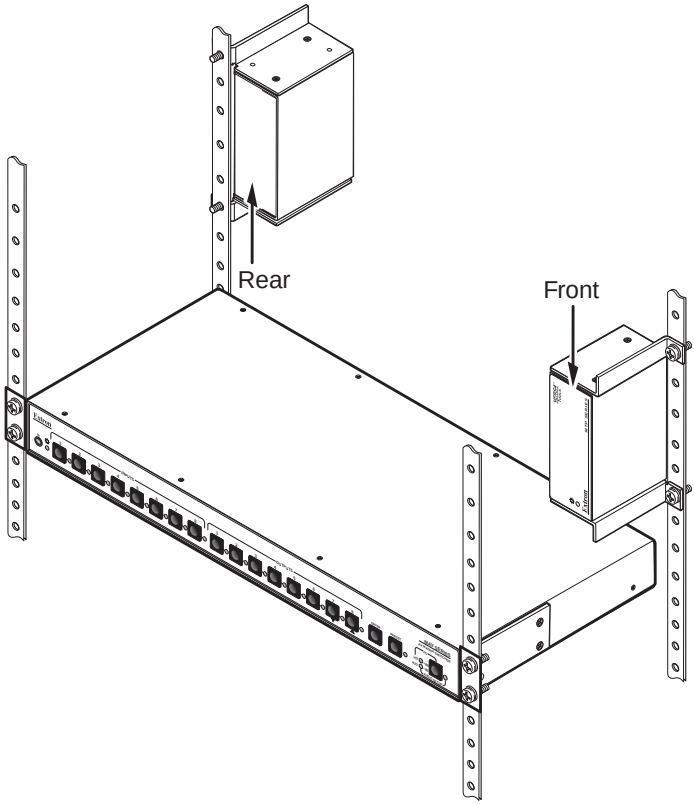


Figure 5 — Typical back of the rack installations

Furniture or projector mounting

Use the optional mounting kit (furniture, part #**70-212-01,** or projector, part #**70-217-01**) to mount the MTP as follows (figure 6):

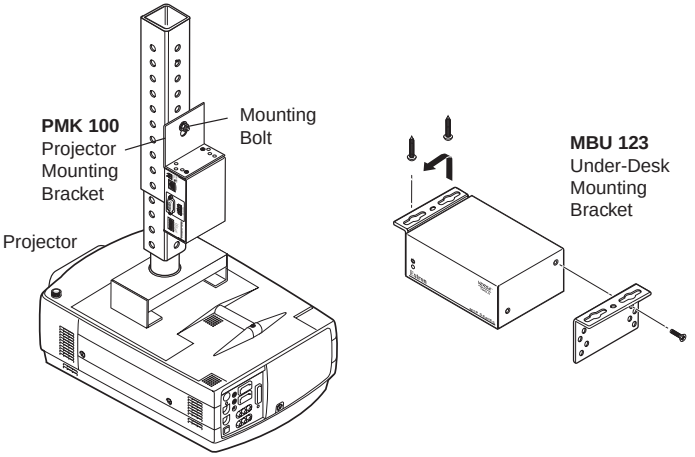


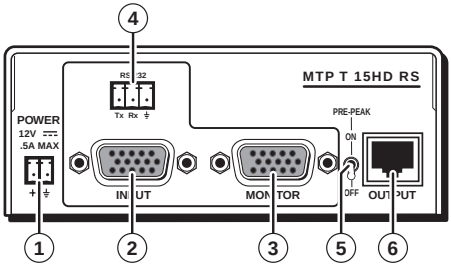
Figure 6 — Desk and projector mounting the MTPs

1. Remove the feet from the bottom of the MTP, if they are installed.
2. Attach the mounting brackets to the MTP with the machine screws provided.
3. **For furniture mounting**, hold the MTP with the attached brackets against the mounting surface. Mark the bracket screw hole locations on the mounting surface.
4. **For furniture mounting**, drill 3/32" (2 mm) diameter pilot holes, 1/4" (6.3 mm) deep in the mounting surface at the marked screw locations.
5. **For furniture mounting**, insert #8 wood screws into the four pilot holes. Tighten each screw into the mounting surface until just less than 1/4" (6 mm) of the screw head protrudes.
6. **For furniture mounting**, align the mounting screws with the slots in the brackets and place the MTP against the surface, with the screws through the bracket slots.
7. **For furniture mounting**, slide the MTP slightly forward or back, then tighten all four screws to secure the MTP in place.
8. **For projector mounting**, secure the MTP to a projector mount by inserting the mounting bolt through the bracket's slotted hole and tightening the bolt.

Connections and Settings

Transmitter

See figure 7 to identify the rear panel connections on the transmitter.



NOTE *A "C7" label is affixed to transmitters designed for CAT 7 cable.*

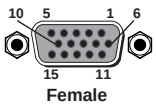
Figure 7 — Transmitter's rear panel features

Power connection

(1) **Power connector —** Plug the included external 12 VDC power supply into this 2-pole captive screw connector. See "Power supply wiring" on page 18 to wire the connector.

Video and serial data connections

(2) **Input video connector —** Connect a computer video source to this 15-pin HD connector for high resolution video input.



NOTE

Input only sync signals, no video signals, on the sync pins, 13 and 14.

For component video, use the R (R-Y) and R return pins (pins 1 and 6), G (Y) and G return pins (pins 2 and 7), and B (B-Y) and B return pins (pins 3 and 8).

For S-video, use the R, R return (C-chroma), G, and G return (Y-luma) pins.

For composite video, use the G pin and the associated return pin. For additional genlocked video signals, use the R, B, and associated return pins.

(3) **Monitor connector —** Connect a video monitor to this 15-pin HD connector for buffered, high resolution video loop through.

④ **RS-232 connector —** Connect a serial communications port to this 3.5 mm, 3-pole captive screw connector for bidirectional RS-232 communication. Wire the connector as shown in figure 8.

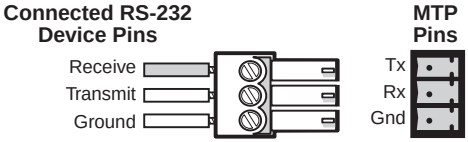


Figure 8 — RS-232 connector wiring

NOTE *By default, the RS-232 portion of the TP link is unidirectional only from the transmitter to the receiver. If there is only one receiver in a system, a jumper within the receiver allows the RS-232 communication to be bidirectional. See "Receiver Jumpering" on page 6.*

Twisted pair connection and settings

⑤ **Pre-Peak switch —** The Pre-Peak switch alters the TP signal output to correct for long cable runs. See the table on page 5 for suggested switch settings based on the transmitted video format and transmission distance.

⑥ **Transmitter Output connector —** Connect one end of a TP cable to this RJ-45 female connector on the transmitter.

CAUTION *Do not connect these devices to a computer data or telecommunications network.*

NOTE *The non-C7 transmitters and receivers will not work properly with CAT 7 TP cable.*

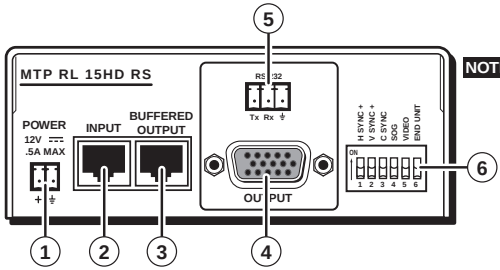
The C7 transmitters and receivers will work properly only *with CAT 7 UTP cable.*

Connect the free end of the same TP cable from the transmitter to the receiver's Input RJ-45 female connector.

See "TP cable termination" on page 20 to properly wire the RJ-45 connectors.

Receiver

Figure 9 shows an MTP RL 15HD RS receiver, which has all of the connectors and other features that you will find on either receiver in the MTP 15HD RS series.



NOTE *A "C7" label is affixed to receivers designed for CAT 7 cable.*

Figure 9 — Receivers' rear panel features

Power connection

(1) **Power connector —** Plug the included external 12 VDC power supply into this 2-pole captive screw connector. See "Power supply wiring" on page 18 to wire the connector.

Twisted pair connections

CAUTION *Do not connect these devices to a computer data or telecommunications network.*

NOTE *The non C7 transmitters and receivers will not work properly with CAT 7 TP cable.*

The C7 transmitters and receivers will work properly only *with CAT 7 UTP cable.*

(2) **Receiver input connector —** Connect one end of the TP cable from the transmitter or from the Buffered Output connector of a receiver to this RJ-45 female connector.

See "TP cable termination" on page 20 to properly wire the RJ-45 connectors.

③ **Buffered Output connector —** Connect one end of a TP cable to this female RJ-45 connector. Connect the free end of the same TP cable from the receiver to the female Input RJ-45 connector on another receiver.

See "TP cable termination" on page 20 to wire the RJ-45 connectors.

NOTE *The receiver's buffered output does not provide pre-peaking control. The total recommended distance for an entire daisy chain is the same as for a single transmitter and receiver. The Pre-Peak switch has the same affect on the recommended transmission distance for a daisy chain as for a single transmitter and receiver.*

NOTE *Up to 8 receivers can be connected in series using Buffered Output connectors, provided that the total distance from the transmitter's TP output to the last receiver in the chain does not exceed the recommended distance for the resolution being used.*

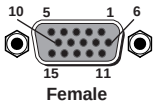
NOTE *See the recommended transmission ranges in the table on page 5. The recommendations in the table apply equally for a single transmitter and receiver and for a transmission daisy chain. For example, the maximum suggested range for 1024 x 768 video is 300' with Pre-Peak off and 500' with Pre-Peak on for either one transmitter and one receiver or a transmitter and three daisy-chained receivers.*

NOTE *For daisy-chained units, the first receiver in the chain must be at least 100' from the transmitter when the Pre-Peak switch is on.*

NOTE *For daisy-chained units, any receiver in the chain closer than 350' may experience some form of over-peaking when the Pre-Peak switch is on.*

NOTE *If a receiver is the last receiver in a daisy chain, its End Unit DIP switch setting needs to be changed. See DIP switches, item ⑥, on the next page.*

Video and serial data connections and settings

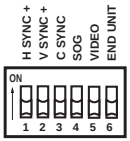


④ **Output video connector —** Connect a projector or other high resolution video device to this 15-pin HD connector.

⑤ **RS-232 connector —** Connect a serial communications port to this 3.5 mm, 3-pole captive screw connector for bidirectional RS-232 communication. Wire the connector as shown in figure 8 on page 14.

NOTE *By default the RS-232 link is unidirectional only, from the transmitter to the receiver. You **can** reconfigure the receiver for bidirectional communication in a **single-receiver system only** by changing the directional jumper (see "Receiver Jumpering", on page 6).*

⑥ **DIP switches**



Horizontal Sync (H Sync +) switch — Set this switch up for positive horizontal sync (or positive composite sync if the Composite Sync switch is on) or down for negative sync.

Vertical Sync (V Sync +) switch — Set this switch up for positive vertical sync or down for negative sync.

NOTE *For H Sync + and V Sync +, most devices use negative sync.*

Composite Sync (C Sync) switch — Set this switch up for RGBS or down to output RGBHV or RGsB video. See the table below.

Input signal format to the transmitter	Output signal format from the receiver	Receiver's DIP switch settings		
		C Sync	SOG	Video
RGBHV	RGBHV	↓	↓	↓
	RGBS	↑	↓	↓
	RGsB	↓	↑	↓
RGBS	RGBS	↑	↓	↓
	RGsB	↓	↑	↓
RsGsBs	RsGsBs	↓	↓	↑
RGsB	RGsB	↓	↓	↑
Component	Component	↓	↓	↑
S-video	S-video	↓	↓	↑
Composite	Composite	↓	↓	↑

Sync-on-Green (SOG) switch — Set this switch up for RGsB video (when the input is RGBHV or RGBS) or down to output RGBHV, RsGsBs, or RGBS video. See the table above.

Video switch — Set this switch up for RsGsBs, RGsB, component/S-video/composite video or down to output RGBHV or RGBS video. See the table on page 17.

NOTE *Set the Composite Sync, SOG, and Video DIP switches as shown in the table on page 17 for the various input and output video formats.*

End Unit switch — Set this switch **up** if **either** of the following is true:

- The receiver being configured is the only receiver connected to the transmitter.
- The receiver being configured is the last receiver in a daisy-chained system.

If one or more receivers are connected to the Buffered Output RJ-45 connector of the receiver being configured, set that receiver's End Unit switch **down**.

Power supply wiring

Figure 10 shows how to wire the connector.

CAUTION *Power supply voltage polarity is critical. Incorrect voltage polarity can damage the power supply and the transmitter or receiver. Identify the power cord negative lead by the ridges on the side of the cord.*

To verify the polarity before connection, plug in the power supply with no load and check the output with a voltmeter.

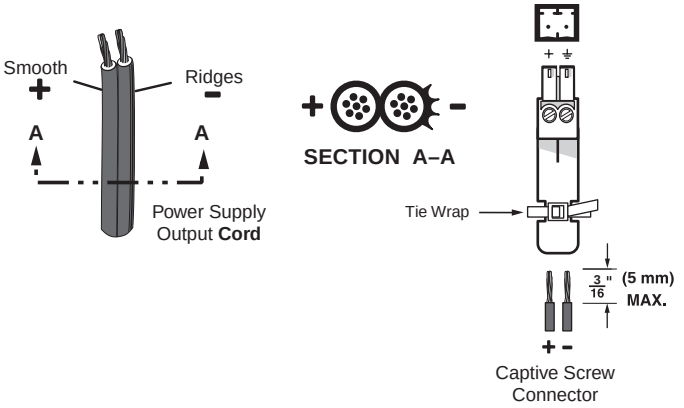


Figure 10 — Power connector wiring

WARNING *The two power cord wires must be kept separate while the power supply is plugged in. Remove power before wiring.*

CAUTION *The length of the exposed (stripped) copper wires is important.* ***The ideal length is 3/16″ (5 mm).*** *Longer bare wires can short together. Shorter wires are not as secure in the connector and could be pulled out.*

NOTE *Do not tin the power supply leads before installing in the direct insertion connector. Tinned wires are not as secure in the connectors and could be pulled out of the connector.*

Use the supplied tie-wrap to strap the power cord to the extended tail of the connector.

NOTE *Your transmitter/receiver pair may have shipped with a blue captive screw connector. This blue connector can be plugged into either a blue or an orange power receptacle.*

The blue connector does not have the extended tail or the included tie-wrap.

As an alternative, an Extron PS 124 Universal 12 VDC Power Supply, part **#60-1022-01**, can power multiple MTPs or other Extron 12 VDC devices using only one AC power connector.

TP cable termination

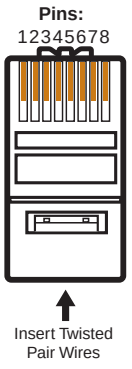
NOTE *RJ-45 termination with CAT 5, CAT 5e, or CAT 6 cable (for non-C7 units **only**) or CAT 7 cable (for C7 units **only**) must comply with the TIA/EIA T568A or TIA/EIA T568B wiring standards for all connections.*

*RJ-45 termination with Skew-Free A/V UTP cable (for non-C7 units **only**) must comply with TIA/EIA T568A only.*

NOTE *The non C7 transmitters and receivers will not work properly with CAT 7 TP cable.*

The C7 transmitters and receivers will work properly only *with CAT 7 UTP cable.*

Figure 11 shows the recommended termination of TP cables in accordance with the TIA/EIA T568A or TIA/EIA T568B wiring standards. You can use either standard with CAT 5, 5e, 6, or 7 cable, but **use the same standard on both ends of the cable**.



Pin	TIA/EIA T 568 A Wire color	TIA/EIA T 568 B Wire color	Signal
1	White-green	White-orange	Red/V. sync+
2	Green	Orange	Red/V. sync-
3	White-orange	White-green	Green/H. sync+
4	Blue	Blue	Blue+
5	White-blue	White-blue	Blue-
6	Orange	Green	Green/H. sync-
7	White-brown	White-brown	Mono audio +
8	Brown	Brown	Mono audio -

NOTE *If you are using Enhanced Skew-Free™ A/V cable, use the TIA/EIA T568A standard only.*

Figure 11 — TP cable termination

NOTE *For proper gounding of **CAT 7 cable only**, ensure the shield around each wire pair and the shield around the CAT 7 cable are all tied to the RJ-45 connectors on both ends, in accordance with the connector manufacturer's specifications.*

NOTE *Enhanced Skew-free A/V cable is **not recommended** for Ethernet/LAN applications. This cable is specially designed for compatibility with Extron's Twisted Pair products that are wired using the TIA/EIA 568A standard.*

The green, brown, and blue pairs of this cable have virtually identical lengths and should be used to transmit the RGB signals.

The orange pair of this cable has a different length and ***should not*** *be used to transmit the RGB signals.*

Front Panel Controls and Indicators

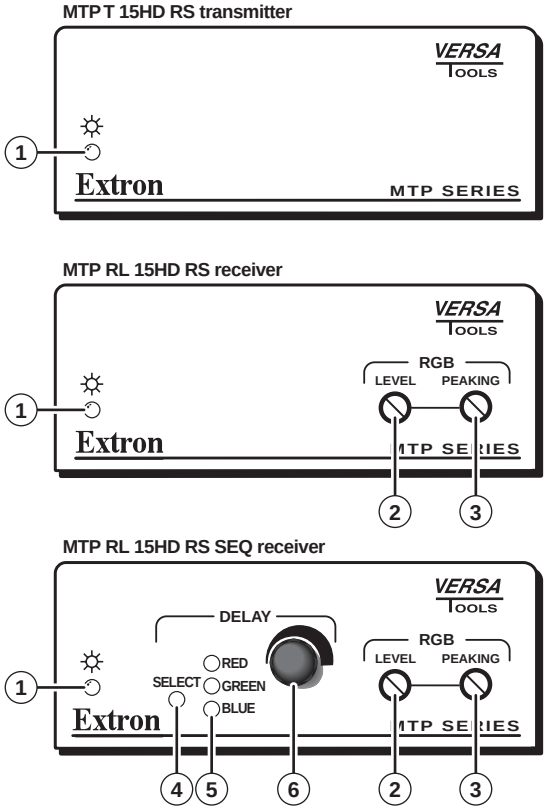


Figure 12 — MTP transmitter and receiver front panels

(1) **Power LED —** Indicates power is applied to the MTP.

(2) **Level control** — The Level control alters the video output voltage to affect the brightness of the displayed image. Adjust the knob while viewing the displayed image to set the level/boost that provides the best picture quality.

③ **Peaking control** — Peaking affects the sharpness of a picture. Increased peaking can compensate for mid- and high-frequency detail loss from low bandwidth system components or capacitance in long cables. The minimum setting (at the counterclockwise limit) provides no peaking. The maximum setting (at the clockwise limit) provides 100% peaking. Adjust this control while viewing the displayed image to obtain the optimum picture sharpness.

④ **Select button (SEQ model only) —** This recessed button selects the red, green, or blue video signal to adjust and resets all three video signals to a skew delay of zero nanoseconds.

Use a Tweeker or small screwdriver to press and release this button to cycle among selecting the red, green, or blue video signal to adjust. The selected signal is indicated by the Red, Green, and Blue LEDs (⑤).

NOTE *The SEQ receiver automatically saves the setting for the video signal that is being deselected when you push this button or when the selection times out after 10 seconds.*

Press and **hold** this button for approximately 3 seconds to zero the skew delay for red, green, and blue. The Red, Green, and Blue LEDS (⑤) all turn off. Release the button.

⑤ **Red, Green, and Blue LEDs (SEQ model only) —** These LEDs indicate the video signal that is selected by the Select button (④) for skew adjustment using the Adjust control (⑥). The LED for the selected color flashes when the skew compensation for that color's video signal has reached the minimum or maximum limit.

⑥ **Delay (skew adjustment) control (SEQ model only) —** This control delays the selected red, green, or blue video signal by up to 62 nanoseconds. The delay is applied in incremental, 2-nanosecond, steps. Rotate the control counterclockwise to reduce the delay or clockwise to increase the delay.

NOTE *The control's movement is smooth; it does not have mechanical steps or high- and low-limit stops.*

Watch the displayed image to observe the steps of delay.

The Red, Green, or Blue LED (⑤) (whichever is selected) flashes to indicate that the control has reached the minimum (counterclockwise rotation) or maximum (clockwise rotation) limit.

Skew Delay Compensation

CAT 5/5e/6/7 TP cable can lead to registration errors between the red, green, and blue video signals. Pair skew can be measured with test equipment or identified by viewing a crosshatch test pattern with a critical eye to determine if either the red, green, or blue video image leads (appears to the left of) the other two video images.

NOTE *Unless the TP cable is changed, the skew adjustment should only need to be made once, during installation.*

SEQ receiver skew compensation

The SEQ receiver has built-in skew compensation capabilities. Adjust the equalization as follows:

1. **Zero the skew delay** for red, green, and blue as follows:
   - **a**. Use a Tweeker or other small screwdriver to press and **hold** the Select button for 3 seconds. The Red, Green, and Blue LEDs all go out.
   - **b**. Release the Select button.
2. Use UTP cable test equipment or examine the displayed video image with a critical eye to **determine which video signal** — red, green, or blue — **is most shifted to the left**.

NOTE *A crosshatch test pattern or a black background with vertical white lines is ideal for determining skew.*

3. **Adjust the leftmost video signal** as follows:

NOTE *The SEQ receiver **cannot** shift the rightmost video image to the left.*

   - **a**. Use a Tweeker or other small screwdriver to press and release the Select button until the LED lights for the left-shifted color — Red, Green, or Blue.
   - **b**. ***Slowly*** rotate the Delay control clockwise while monitoring the display. Observe that the leftmost color shifts rightward one step at a time. Continue to rotate the control until that color is properly converged.

NOTE *A 2-nanosecond adjustment is very fine. Up to 10 nanoseconds of delay may be necessary before you detect a change in the display.*

   - **c**. Use a Tweeker or other small screwdriver to press the Select button one more time to save the most recent adjustment or allow the 10-second timeout to elapse.
4. If the remaining colors are left shifted, repeat steps **2** and **3**.

Non-SEQ receiver skew compensation

Try using the following methods to minimize or eliminate pair skew:

- Switch to Extron's Enhanced Skew-Free A/V UTP cable.
- Add a skew compensation cable equal to the length of pair skew to the receiver's output.
- Install an SEQ 100 15HD Skew Equalizer on the receiver's video output and adjust the skew for the leading video image.

Specifications

Video

Gain	Unity
Number/signal type	1 set of proprietary analog signals
Connectors	1 female RJ-45

Video input and loop through — transmitter

Number/signal type	1 analog RGBHV, RGBS, RGsB, RsGsBs, component video, S-video, or composite video 1 buffered RGBHV, RGBS, RGsB, RsGsBs local monitor loop through (includes ID bits)
Connectors	2 female 15-pin HD
Nominal level	1 Vp-p for Y of component video and S-video, and for composite video 0.7 Vp-p for RGB and for R-Y and B-Y of component video 0.3 Vp-p for C of S-video
Minimum/maximum levels	0.3 V to 1.45 V p-p
Impedance	75 ohms
Horizontal frequency	15 kHz to 130 kHz
Vertical frequency	30 Hz to 150 Hz
Return loss	<-30 dB @ 5 MHz
DC offset (max. allowable)	250 mV

Video output — receivers

Number/signal type	1 set of proprietary analog signals 1 analog RGBHV, RGBS, RGsB, RsGsBs, component video, S-video, or composite video
Connectors	1 female RJ-45 1 female 15-pin HD
Nominal level	1 Vp-p for Y of component video and S-video, and for composite video 0.7 Vp-p for RGB and for R-Y and B-Y of component video 0.3 Vp-p for C of S-video
Minimum/maximum levels	0.3 V to 1.45 V p-p
Impedance	75 ohms
Return loss	<-30 dB @ 5 MHz
DC offset	<±20 mV with input at 0 offset
Maximum resolution	2048 x 1080

Sync

Input type (transmitter)	RGBHV, RGBS, RGsB, RsGsBs
Output type (receivers)	RGBHV, RGBS, RGsB, RsGsBs
Standards	NTSC 3.58, NTSC 4.43, PAL, SECAM
Input level (transmitter)	3.5 V to 5.5 Vp-p, unterminated
Output level (receivers)	4.0 V to 5.0 Vp-p, unterminated
Input impedance	510 ohms
Output impedance	110 ohms
Max. input voltage	5.5 Vp-p
Polarity	
Transmitter	Positive or negative (follows input polarity)
Receivers	Positive or negative (switch selectable)

Control/remote — external device (pass-through, unidirectional or bidirectional)

Serial control port input/output

MTP C7 T 15HD RS, MTP T 15HD RS

RS-232 via (1) 3.5 mm, 3 pole captive screw connector

Receivers..... 1 set of proprietary signals on a female RJ-45 jack

Serial control port output/input

MTP C7 T 15HD RS, MTP T 15HD RS

1 set of proprietary signals on a female RJ-45 jack

MTP C7 RL 15HD RS, MTP C7 RL 15HD RS SEQ, MTP RL 15HD RS, MTP RL 15HD RS SEQ

RS-232 via a 3.5 mm, 3 pole captive screw connector

NOTE *The serial communications link of an MTP C7 RL 15HD RS, MTP C7 RL 15 HD RS SEQ, MTP RL 15HD RS, or MTP RL 15 HD RS SEQ is unidirectional only, transmitter to receiver,* **unless** *the receiver's directional jumper has been repositioned. The jumper should be repositioned only when the receiver is the only one in the system.*

Baud rates ..... Up to 38400 bps at up to 600' (183 m) (Higher data rates and distances are possible. Performance will vary based on baud rate and cable length.)

Protocol..... Data bits = 5 - 8
Stop bits = 1 or 2
Parity = odd, even, none
Flow control = XON, XOFF, none

NOTE *Protocol is mirrored between the transmitter and the receiver.*

Serial control pin configurations. Captive screw connectors: 1 = TX, 2 = RX, 3 = GND

General

External power supply	100 VAC to 240 VAC, 50-60 Hz, external; to 12 VDC, 1 A, regulated
Power input requirements	12 VDC, 0.5 A
Temperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C)/ 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C)/ 10% to 90%, noncondensing
Cooling	Convection, no vents
Rack mount	Yes, with optional 1U, 9.5" deep rack shelf (RSU 129, **#60-190-01** or RSB 129, **#60-604-01**); 1U, 6" deep rack shelf (RSU 126, **#60-190-10** or RSB 126, **#60-604-10**); or VersaTools® 1U, 3.5" deep rack shelf (RSF 123, **#60-190-20** or RSB 123, **#60-604-20**)
Furniture mount	Yes, with optional Mini Under-Desk Mounting Kit, part #**70-212-01**
Projector mount	Yes, with optional projector mounting kit, part #**70-217-01**
Enclosure type	Metal
Enclosure dimensions	1.7" H x 4.3" W x 3.0" D (1U high, quarter rack wide) 4.3 cm H x 10.9 cm W x 7.6 cm D (Depth excludes connectors and knobs.)
Product weight	0.4 lbs (0.2 kg)
Shipping weight	2 lbs (1 kg)
Vibration	ISTA 1A in carton (International Safe Transit Association)
Safety	CE, c-UL, UL
EMI/EMC	CE, C-tick, FCC Class A, ICES, VCCI
MTBF	30,000 hours
Warranty	3 years parts and labor

NOTE *All nominal levels are at ±10%.*

NOTE *Specifications are subject to change without notice.*

Part Numbers

MTP (non C7) transmitter and receivers

Transmitter and receivers	Part number
MTP T 15HD RS transmitter	60-652-01
MTP RL 15HD RS receiver	60-735-01
MTP RL 15HD RS SEQ receiver	60-735-02

MTP C7 transmitter and receivers

Transmitter and receivers	Part number
MTP C7 T 15HD RS transmitter	60-652-02
MTP C7 RL 15HD RS receiver	60-735-03
MTP C7 RL 15HD RS SEQ receiver	60-735-04

Accessories

Accessories	Part number
P/S 123 multiple output 12 V power supply	60-814-01
RSU 129 19" 1U 9.5" deep universal rack shelf	60-190-01
RSB 129 19" 1U 9.5" deep basic rack shelf	60-604-02
RSU 126 1U 6" deep rack shelf kit	60-190-10
RSB 126 basic 1U 6" deep rack shelf	60-604-11
RSF 123 VersaTools 3" deep universal rack shelf	60-190-20
RSB 123 VersaTools 3" deep basic rack shelf	60-604-21
MBB 100 VersaTools back of the rack mounting kit	70-367-01
MBU 123 VersaTools furniture mounting kit	70-212-01
PMK 100 VersaTools projector mounting kit	70-217-01

Cables/connectors

NOTE *Enhanced Skew-Free™ A/V UTP cables are not recommended for Ethernet/LAN applications.*

NOTE *Enhanced Skew-Free™ A/V UTP cables are recommended for* ***non C7 systems only****.*

Enhanced Skew-Free™ A/V cable	Part number
Enhanced Skew-Free A/V cable (cut, various lengths)	26-569-*xx*
Enhanced Skew-Free A/V 1000' (bulk) (non-plenum)	22-141-03
Plenum enhanced Skew-Free A/V 1000' (bulk)	22-142-03

RJ-45 connector	Part number
CAT 6 jack (black)	10-476-01
CAT 6 jack (red)	10-477-01
CAT 6 jack (blue)	10-478-01
CAT 6 jack (orange)	10-479-01
CAT 6 jack (gray)	10-480-01
CAT 6 jack (white)	10-481-01
CAT 6 jack (ivory)	10-482-01

Extron Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:
Extron USA
1001 East Ball Road
Anaheim, CA 92805
U.S.A.

Europe, Africa, and the Middle East:
Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

Asia:
Extron Asia
135 Joo Seng Road #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Japan:
Extron Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

China:
Extron China
686 Ronghua Road, Songjiang District
Shanghai 201611
China

Middle East:
Extron Middle East
Dubai Airport Free Zone
F12, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.6383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

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